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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/557,480	04/24/2000	Andrew McRae	112025-0180	7901

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EXAMINER
HARPER, KEVIN C

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 06/07/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *24 April 2000*.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-39* is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-39* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on *24 April 2000* is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☐ All   b) ☐ Some * c) ☐ None of:

         1. ☐ Certified copies of the priority documents have been received.

         2. ☐ Certified copies of the priority documents have been received in Application No. _____.

         3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *2,3*.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____ .

Drawings

1.   The drawings are objected to because in figure 12, one of the boxes should be labeled

with "lookup table" for clarity (37 CFR 1.83(a)). A proposed drawing correction or corrected

drawings are required in reply to the Office action to avoid abandonment of the application. The

objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the

basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 15-22, 29, 32 and 38-39 are rejected under 35 U.S.C. 102(e) as being

anticipated by Li et al. (US 6,529,508).

2.   Regarding claims 1, 5, 15 and 19, Li discloses a method of performing data classification

(title), where the data has a header that is classified according to applicable rules (col. 7, line 63

through col. 9, line 2). The method comprises the steps of creating an inherently empty bitmap

including a number of bits equal to a number of applicable rules, applying the rules to the data

header (col. 9, lines 15-19 and 26-29; note: a bitmap is created corresponding to applicable

rules), and for each matching rule and setting a bit in the bitmap corresponding to the rule (col. 9,

lines 35-40 and 48-50). The bitmap is stored in an entry in a lookup table that corresponds to a

data header (col. 9, lines 17-22). Further regarding claims 5 and 19, the classification is

performed for each of plural data header fields (Figure 5, item 82; col. 17, lines 12-13 and 51-52;

figure 10). Further regarding claims 15 and 19, the method is performed by a processor (figure

5, items 80; col. 9, lines 4-10) associated with inherent instructions stored on a processor

executable medium.

3.   Regarding claims 2, 6, 16 and 20, the method further comprises assigning an index

number to the bitmap (figure 10, items 302, 306 and 310, indices P1-P5; figure 11; col. 17, lines

37-41) and storing the index number as an index to the entry that contains the bitmap

corresponding to the data header (col. 17, lines 50-54). The index is associated with the data

header (col. 17, lines 35-39; figure 10; note: an IP prefix is associated with a pointer).

4.   Regarding claims 3, 7, 17 and 21, for each data header from zero to a maximum value, an

index to a bitmap is determined (figure 10, IP addresses from 0.0.0.0 to 255.255.0.0).

5.   Regarding claims 4, 8, 18 and 22, for each bitmap corresponding to an iterated value of a

data header, determining if there is a matching bitmap previously created (figure 10; note:

repeated pointer values, P1-P5, for the table entries), assigning a new index number as an index

to a new entry that contains the bitmap in the lookup table if there is no previous bitmap that

matches (figure 10, item 305; note: unique bitmaps for each pointer, where a first occurring

pointer P1-P5 exists in for the prefix addresses -- 120.2.0.0 for P1, 120.3.0.0 for P2, etc.).

6.   Regarding claims 29, 32 and 38-39, Li discloses an apparatus for performing data

classification (title; figure 5), where the data has a header that is classified according to

applicable rules (col. 7, line 63 through col. 8, line 2). The apparatus comprises a memory

having a lookup table (col. 9, lines 15-19), where the table comprises plural indices associated

with plural rule bitmaps (figure 10, indices P1-P5 associated with rule bitmaps; col. 17, lines 39-40). The apparatus further comprises a circuit (Figure 5, processor 80; col. 9, lines 15-17) to receive the data header and use the data header as an entry to the lookup table to determined the bitmaps of the lookup table (col. 9, lines 48-50). Further regarding claim 39, the header is divided into several fields figure 5, items 82; col. 17, lines 12-13 and 51-52; figure 10).

Claims 33-34 and 36-37 are rejected under 35 U.S.C. 102(a) as being anticipated by Gupta et al, "Packet classification on Multiple Fields" (the date of this reference is September 2, 1999, as noted in the SIGCOMM '99 Session Archive).

7.   Regarding claims 33 and 36, Gupta discloses an apparatus for performing data classification (abstract, lines 1-4) wherein data having a data header is classified according to applicable rules (section 2, lines 12-14). The apparatus comprises a circuit (section 6.2, lines 1-2) to divide the data header into several fields (section 2.1, table 3; appendix, table 6; figures 5 and 22; note: the network source address, destination address, layer 4 protocol type, and destination port number are each used as entries to lookup tables), at least two first level lookup tables (figure 22, phase 0 lookup tables) stored in a content addressable memory (section 4, lines 1-4) to receive fields of the data header and to generate first outputs responsive to the received fields (section 5.2, second paragraph, lines 1-14), and a final level lookup table stored in memory to receive the first outputs from the first level lookup tables (section 5.2, second paragraph, lines 15-21), where the first outputs index a bitmap in the final level lookup table (Figure 22, phase 1 outputs to phase 2 lookup table) and the bitmap represents matching rules of the data header (figure 5, classID; figure 22, phase 2, matching rule output of final lookup table; section 5.2, lines 1-2; note: T bits of classID).

8.   Regarding claim 34, the apparatus comprises at least two intermediate level lookup tables

(figures 5 and 9; section 6.1, second paragraph, lines 1-5).

9.   Regarding claim 37, the circuit is a processor (section 6.2, Software, lines 3-4; note:

computer CPU executing the software).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in
> section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are
> such that the subject matter as a whole would have been obvious at the time the invention was made to a person
> having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the
> manner in which the invention was made.

Claims 9-14 and 23-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li

et al., as applied to claim 8 or 22 above, in further view of Gupta et al., "Packet classification on

Multiple Fields".

10.   Regarding claims 9-14 and 23-28, Li discloses using a lookup table on several fields

(Figure 5, items 82). However, Li does not disclose cross-producting lookup tables

corresponding to several fields to form a next level lookup table. Gupta discloses cross-

producting plural lookup tables corresponding to plural fields of a data header (section 5.2, third

paragraph ["In the second phase, we consider..."], lines 1-5) to form a next level lookup table

(figure 22, phase 1 and phase 2; note: combination of indices from phase 0 lookup tables

provides for an index to a phase 1 lookup table, and so on). The indices to the next level lookup

are unique and each index to the next level is related to a next level bitmap having a unique next

level index number (figure 22, phase 1, eqID and CBM; note: entries in chunk #0 of phase 1).

Cross-producting lower level lookup tables is implemented until one final table remains (figure 22), where the final table contains bitmaps and the first and best matching bitmap is used for a header to associate the data packet with applicable rules (figure 5, classID; figure 22, phase 2, matching rule output of final lookup table; section 5.2, lines 1-2; note: T bits of classID). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to perform cross-producting of lookup tables in the invention of Li in order to reduce computational processing and memory requirements to determine a set of matching rules based on several fields of a data header (section 5.2, first paragraph, lines 1-9 and figure 5; section 7.1, table 5, recursive flow classification, Pros, as compared to bit-level parallelism, Cons; section 4, fourth paragraph, lines 1-4: note: a parallel search is used in Li as shown in figure 5 and described at col. 9, lines 46-48).

Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., as applied to claims 29 above, in further view of Thornton et al. (US 6,662,293).

11.   Li discloses a lookup table, but does not disclose that the lookup table is stored in a flash memory. Thornton discloses that a lookup (routing) table stored in flash memory (col. 24, lines 41-42). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have a lookup table stored in a flash memory in the invention of Li in order to prevent the loss of the lookup table (Thornton, col. 24, lines 42-43).

Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Li et al., as applied to claims 29 above, in further view of Kloth et al. (US 6,643,260).

12.   Li discloses a lookup table, but does not disclose that the lookup table is stored in a flash memory. Kloth discloses that a lookup (routing) table stored in a CAM (Figure 4A, item 82).

Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have a lookup table stored in a CAM in the invention of Li in order to provide a fast access for a flexibly-assigned classification determination of a packet.

Claim 35 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gupta et al., as applied to claims 34 above, in further view of Thornton et al. (US 6,662,293).

13.   Regarding claim 35, Gupta discloses a lookup table, but does not disclose that the lookup table is stored in a flash memory. Thornton discloses that a lookup (routing) table stored in flash memory (col. 24, lines 41-42). Therefore, it would have been obvious to one skilled in the art at the time the invention was made to have a lookup table stored in a flash memory in the invention of Gupta in order to prevent the loss of the lookup table (Thornton, col. 24, lines 42-43).

Conclusion

14.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Varghese et al. (US 6,449,256) discloses cross-producting rule tables (figures 13 and 20; col. 19, lines 14-25). Lakshman et al. (US 5,951,651) discloses a rules bitmap (figure 5) for different packet fields (figure 6; col. 4, lines 66 through col. 5, line 5).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kevin Harper whose telephone number is 703-305-0139. The examiner can normally be reached weekdays from 11:30 AM to 8:00 PM ET.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao, can be reached at 703-308-5463. The centralized fax number for the Patent Office is 703-872-9306.

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Kevin C. Harper
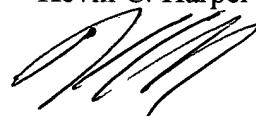
June 1, 2004

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June 1, 2004